MLC Solid State Memory Devices with in Excess of 200,000 Individual Voltage Levels per Voltage Cell Utilizing Transient Ion Cathode Collocation Gating

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Introduction

Barriers to the development of more advanced MLC SSD storage devices include the limitations of voltage metering mechanisms as well as the limited ability of the current technology to check voltage without depleting voltage. Current-generation voltage cells must be recharged once for every approximately 100 read operations, with four voltage levels being the maximum safe limit for data stability at this time. In theory, this general type of technology could be used to facilitate over 200,000 discrete voltage states provided a mechanism for metering ever-smaller flows of electrons and returning any electrons that are "borrowed" in the metering process. The following is a description of how one might go about accomplishing that goal.

Abstract

Voltage cells similar to those used today would be accessed in a way somewhat different than what you may be familiar with. The first step is to be able to assess and control the precise number of electrons in any given voltage cell. The first step in the process of making this possible is to tailor a synthetic protein capable of emitting both hydrogen ions and electrons at varying angles of momentum. The protein would thus have a chiral duality. This protein, when stimulated along one helix with an electrical charge, would emit a single hydrogen ion that leaps across the cathode of a voltage cell (at close proximity but without contacting) in the transverse direction. During the less than a nanosecond that it takes to "cross the street," the voltage gate is opened for only the briefest possible time. During this time, two or three electrons are permitted to exit the voltage cell.

Since only two or three electrons could not be reliably conducted or measured by existing technology, a new technology based upon a different type of synthetic protein that might be termed an Electron Pregnant Protein would behave as a snow-covered tree rattled by some intense vibration. Quantities of electrons sufficient for measurement by a sophisticated femtosecond-accurate clock would be emitted downstream as a result of being struck by a single electron.

Two of these amplification proteins that I term EPPs, each at a slightly offset position and at an angle forming a "V" shape would sit just outside of the cathode in the path of electrons emitted. In the event that two electrons are emitted (ideal) each electron could be expected to travel at a different angle since it would be behaving in accordance with Coulomb Attraction.

Each amplification protein is ultimately connected to their own hydrogen nanowire leading to the timing circuit. The difference between the time at which electrons pulse from the two EPPs informs the system as to how many

electrons were contained in the voltage cell with differences of a few femtoseconds correlating to a single level of difference in voltage in this system. The number of pulses received, while usually assumed to be two, could be three or four or some other (hopefully small) number. Knowing how many electrons were emitted (information you would have since you, by this point, know not only how many pulses, but their exact timing) would enable you to know how many electrons to put back into the voltage cell.

Thanks to this feature of chirality found in certain proteins, the electrical stimulation of such a protein may result in a specific, unique response of either emitting an ion or an electron, depending upon where on that protein the stimulus is directed. The same protein used to pass an ion by the cathode in this system can be used to inject electrons back into the voltage cell after a measurement, or in order to write data. Since the helix of said protein is curved, the electron-conducting side of the Gating Protein could be configured to emit electrons at a less-than-transverse angle, resulting in the electrons actually striking the cathode, whereas the ions are meant only to make a close brush with the cathode without contacting it.

Now we have established that with the addition of: 1.) A pair of amplification proteins (EPPs,) 2.) A chiral Gating Protein (GPs) capable of emitting ions and electrons at varying angles of momentum and 3.) Hydrogen nanowires to allow for fine control over the direction and quantity of electrical signals, it is possible to maintain accurate inventories of voltage cells for data storage purposes with margins of error within +/-10 electrons.

Conclusion

The amplification proteins would, of course, be rechargable so as to enable subsequent read operations, with the proteins selected being durable enough for sustained use. The device would, in addition to providing, at minimum, Exabyte-level capacities in the 2.5 inch form factor, use a minimum of electrical energy in its operation.